REMARKS

Claims 1-13 were pending. No claims were amended or cancelled. Thus, claims 1-13 remain pending. Claims 1-5 and 8-13 have been allowed. Applicants are appreciative of the Examiner for indicating allowable subject matter.

Reexamination of the application and reconsideration of the rejection is respectfully requested in view of the following remarks, which follow the order set forth in the Office Action.

Rejection under 35 U. S. C. § 103(a) is Traversed

Claims 6 and 7 were rejected under 35 U. S. C. § 103(a) as being unpatentable over WO 00/60680 to Yamada (U.S. Patent No. 6,632,566, an English equivalent to WO 00/60680 is referred herein, hereinafter referred to as "Yamada"). Applicants respectfully traverse.

Claim 6 recites a powder for use in lithium insertion electrodes with a formula $LiMPO_4$ having an average particle size of less than 1 μm, wherein M is $Fe_xCo_yNi_zMn_w$, with $0 \leq x \leq 1$, $0 \leq y \leq 1$, $0 \leq z \leq 1$, $0 \leq w \leq 1$, $x + z + w > 0$, and $x + y + z + w = 1$.

Claim 7 further requires that M is Fe, and that the powder has a reversible electrode capacity of at least 65% of a theoretical capacity when used as an active component in a cathode that is cycled between 2.70 and 4.15 V vs. Li^+/Li at a discharge rate of C/5 at 25° C.

Yamada discloses a positive electrode active material containing a compound represented by the general formula $Li_xM_yPO_4$, where $0< x \leq 2$ and $0.8 \leq y \leq 1.2$, with M containing a 3d transition metal, where the $Li_xM_yPO_4$ encompasses that with the grain size not larger than 10 μm. *Abstract.* FIGS. 4-6 are disclosed in the Brief Description of the Drawings as follows:

> FIG. 4 is a graph showing the relation between the sintering temperature of $LiFePO_4$ synthesized in samples 1 to 5 and the volumetric grain size distribution of the battery.
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> FIG. 5 is a graph showing the relation between the sintering temperature of $LiFePO_4$ synthesized in samples 1 to 5 and the volumetric grain size distribution of the battery.
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> FIG. 6 is a graph showing the relation between the sintering temperature of $LiFePO_4$ synthesized in samples 1 to 5 and the volumetric cumulative diameter of the battery.

The Action asserts that Yamada suggests "the instantly claimed $LiMPO_4$ [has] the instantly claimed particle size of less than 1 micron," citing col. 10, sample 2, col. 12, lines 13-18 and Fig. 6 of Yamada. *Office Action mailed April 6, 2007, page 3.* The Action further asserts that "the instantly claimed capacity [of claim 7] also is suggested" in view of col. 9 of Yamada. *Office Action mailed April 6, 2007, page 3.* The Action states "[w]here the claimed and prior art

product(s) are identical or substantially identical, the burden of proof is on applicant to establish that the prior art product(s) do not necessarily or inherently possess the characteristics of the instantly claimed product(s), see *In re Best*, 195 USPQ 430." *Office Action mailed April 6, 2007, page 3.* Applicants respectfully traverse.

Applicants respectfully disagree that Yamada teaches explicitly or inherently the claimed $LiMPO_4$ having an average particle size of less than 1 μm. Yamada refers to the data of FIG. 6 by stating "$LiFePO_4$ having a grain not larger than 1 μm, accounts for not less than 10%." *Col. 12, lines 12-15.* Applicants believe that the data depicted in FIGS. 4-6 and the teachings of Yamada illustrate that sample 2 has an average particle size value greater than 1 μm and that the average particle size is about 4 μm. Applicants further believe that the data depicted in FIGS. 4-6 indicates to one of ordinary skill in the art that sample 2 of Yamada comprises more than 50% of particles greater than 1 μm (based on the *logarithmic* abscissa scale about the 1 μm mark).

Moreover, Yamada does not teach or reasonably suggest a process that would necessarily and inevitably produce particles having an average particle size of less than 1 μm. Yamada teaches that "to procure sufficient capacity under a large current, technical measures are required to increase the specific surface area, and also to reduce the grain size," (col. 5, lines 53-55) and states the following:

> As may be seen from FIG. 4, if the sintering temperature is higher than 600 °C., the volumetric distribution of $LiFePO_4$ with the grain size larger than 10 μm, is increased as the center of distribution is shifted towards the coarse grain side. On the other hand, the volumetric distribution of $LiFePO_4$ with the grain size not larger than 10 μm is decreased appreciably.
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> If the sintering temperature is not higher than 600 °C., the volumetric distribution of $LiFePO_4$, having the grain size not larger than 10 μm, is increased as the center of distribution is shifted towards the finer grain side.

Col. 11, lines 52-62.

However, Yamada teaches that "[i]f the sintering temperature is less than 400 °C, there persists a phase containing e.g., trivalent iron compounds, as impurities, that is Fe^{3+}, such that homogenous $LiFePO_4$ cannot be produced." *Col. 8, lines 26-29.* Such impurities reduce the theoretically obtainable capacity of the material. *Table 1 of Experiment 2; col. 14, line 62 through col. 15, line 9.*

Thus, while Yamada discloses a "relation between the sintering temperature and the cumulative volumetric grain size," Yamada teaches away from smaller particles resulting from sintering at a temperature under 400 °C, because sintering at such lower temperatures provides

particles with different characteristics, e.g., "a phase containing e.g. trivalent iron compounds as impurities". *Col. 8, lines 26-29; Table 1 of Experiment 2; col. 14, line 62 through col. 15, line 9.* Therefore, one of ordinary skill in the art would not be motivated to modify the teachings of Yamada, which teaches away from smaller particles in view of the temperature limitations imposed by the sintering process that follows the solid state synthesis of the $LiFePO_4$ from its precursors. Nor would there be any likelihood of success in modifying Yamada since smaller particles of homogeneous $LiFePO_4$ than those disclosed cannot be produced without altering the chemical structure and reducing the capacity of $LiFePO_4$.

Because a $LiMPO_4$ material having an average particle size of less than 1 μm is not disclosed, all of the limitations of instant claim 6 are not taught or suggested in Yamada. Therefore, the requisite *prima facie* conditions of obviousness cannot be met. *MPEP § 2143* (the prior art reference (or references when combined) must teach or suggest all the claim limitations).

As claim 7 is dependent from claim 6, which is believed allowable, claim 7 is also believed allowable.

For the foregoing reasons, claims 1-13 are considered allowable. A Notice to this effect is respectfully requested. If any questions remain, the Examiner is invited to contact the undersigned at the number given below.

Respectfully submitted,

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